

A New Species of *Aristochroa* Tschitschérine (Coleoptera: Carabidae: Pterostichini) from the Gaoligongshan of Western Yunnan Province, China

David H. Kavanaugh¹ and Hongbin Liang²

¹ Department of Entomology, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118, U.S.A. and Research Professor, Biology, San Francisco State University, San Francisco, California; Email: dkavanaugh@calacademy.org.; ² Institute of Zoology, Chinese Academy of Sciences, Beijing 100080, China; Email: lianghongbin@yeah.net.

A new species of the genus *Aristochroa* Tschitschérine, *A. abrupta* Kavanaugh and Liang, sp. nov., is described from the Gaoligongshan of western Yunnan Province, China (type locality: Danzhu He drainage, 2830 m, Gongshan County). Members of this species are distinguished by the abrupt sinuation of the lateral margin of the pronotum in all adults and the long, triangular, right-deflected lamella of the aedeagus in males. Illustrations are provided for these and other structures. This species is unusual also in its occurrence at lower elevations (2770 to 3400 m) than most other members of the genus.

The pterostichine carabid genus *Aristochroa* was described by Tschitschérine (1898) to include a total of five Chinese species. Since then, 12 new species have been added to the genus (Tschitschérine 1903; Straneo 1938; Xie and Yu 1993; Sciaky and Wrase 1997; Zamotajlov and Fedorenko 2000; Liang and Yu 2002).

In July 2000, while conducting fieldwork for an inventory of the carabid beetle fauna of the Gaoligongshan of western Yunnan Province, China, we collected several specimens of *Aristochroa* at localities in each of two separate river valleys on the eastern slope of the mountain range, in Gongshan County, Nujiang Prefecture. In May and September 2002, several more specimens of the genus were collected in or near these valleys. Subsequent morphological comparison of these specimens with representatives and/or descriptions of all other known species has convinced us that they represent a species previously unknown to science. A description of this new species follows.

Aristochroa abrupta Kavanaugh and Liang, sp. nov.

(Figures 1–2, 4, 6, 8, 10–11)

TYPES.— Holotype, a male, deposited in Institute of Zoology, Chinese Academy of Sciences, Beijing (IOZ), labelled: “CASENT1006544” / “China, Yunnan Province, Nujiang Prefecture, Gongshan County, Danzhu He drainage, 13.5 airkm SW of Gongshan, 2830m” / “N 27.62947°/E 98.62010°, 30 June – 5 July 2000, Stop # 00–17K, D.H. Kavanaugh, C.E. Griswold, Liang H.-B., D. Ubick, and Dong D.-Z. collectors”. A total of 21 paratypes (11 males and 10 females) are deposited in the California Academy of Sciences (CAS), Kunming Institute of Zoology (KIZ), and IOZ (see specimen data below, under Geographical distribution).

TYPE LOCALITY.— Danzhu He drainage, 2830 m, N 27.62947°/E 98.62010°, Gongshan County, Yunnan Province, China.



FIGURE 1. Digital photograph of habitus of holotype of *Aristochroa abrupta* sp. nov., dorsal aspect.

DIAGNOSIS.— Adults of *A. abrupta* sp. nov. can be distinguished from all other known species of *Aristochroa* by the following combination of character states: pronotum with lateral margins deeply and abruptly sinuate in posterior one-fifth, parallel anterior to base, with four (three or five in a few specimens) lateral setae anterior to middle, hind angles rectangular, basal foveae smooth, impunctate; pro-, meso-, and metepisterna smooth, impunctate; elytral interval 3 with two (one in a few specimens) discal setiferous pores; elytral intervals 1, 3, 5 and 7 strongly convex, microsculpture distinct on all intervals.

If one were to use the key to species of *Aristochroa* provided by Liang and Yu (2002), specimens of *A. abrupta* would key out at couplet 13, with specimens of *A. gratiosa* Tschitschérine and *A. militaris* Sciaky and Wrase. However, that key does not include the three species described by Zamotajlov and Fedorenko (2000) (namely, *A. sciakyi*, *A. dimorpha*, and *A. kangdingensis*) and is therefore incomplete. We choose not to provide a new key to all known species at this time because it seems likely that additional new species will continue to be found in the near future. Instead, we simply mention characters useful for distinguishing *A. abrupta* adults from those of *A. gratiosa*, *A. militaris*, *A. sciakyi*, *A. dimorpha*, and *A. kangdingensis*.

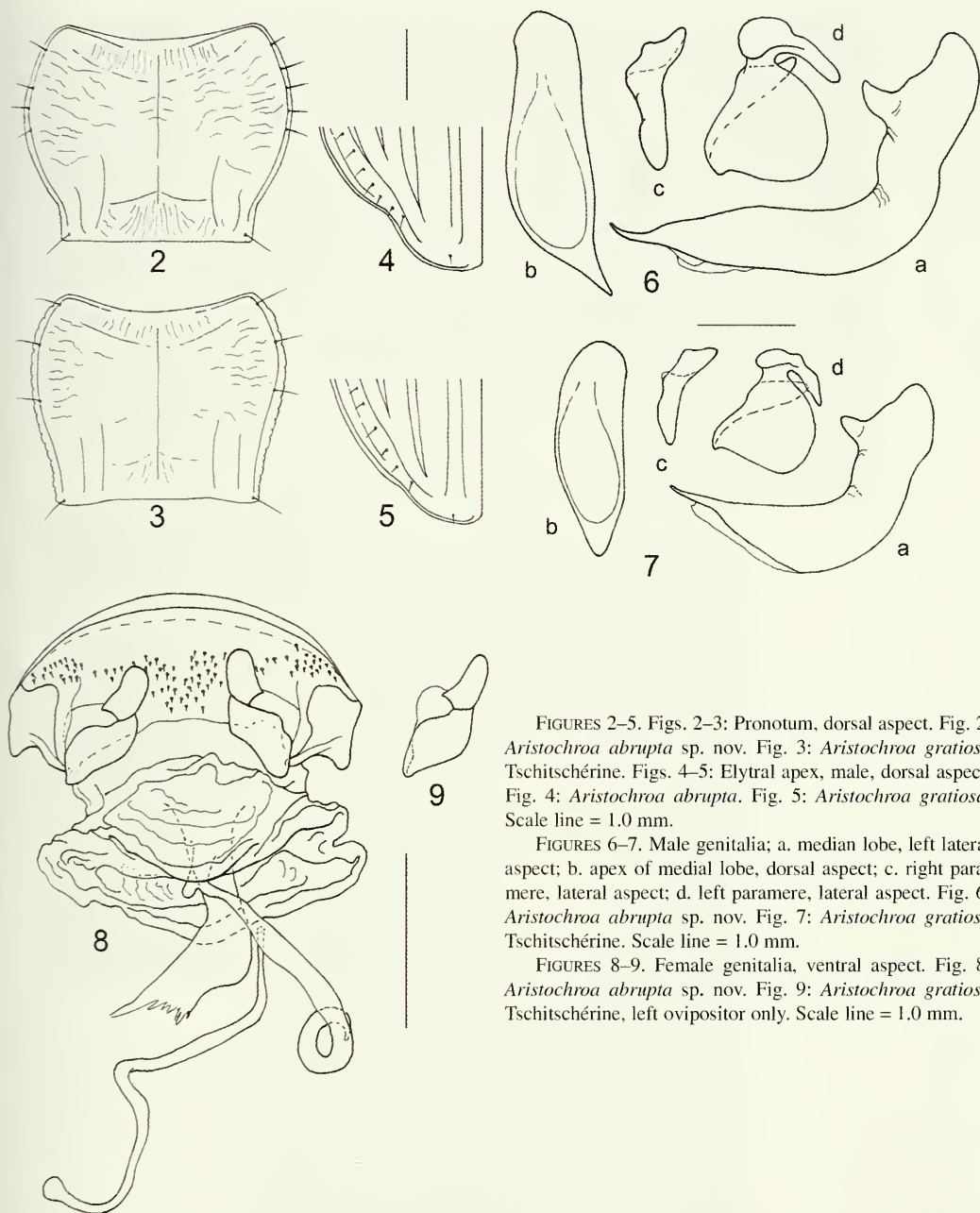
Adults of *A. abrupta* are most similar to those of *A. gratiosa*, but differ with them in having the lateral margin of the pronotum more deeply and abruptly sinuate and less crenulate (compare Figs. 2 and 3), the lateral longitudinal grooves of the basal foveae shorter and slightly S-shaped (long and straight in *A. gratiosa*), the subapical sinuation of the elytral margin much deeper (compare Figs. 4 and 5), and the shape of the aedeagus in males and the gonostylus of the ovipositor in females distinctly different (compare Figs. 6 and 7 and Figs. 8 and 9, respectively). They differ with adults of *A. militaris* in both pronotal shape and shape of the male aedeagus (compare Figs. 2 and 6 here with Figs. 45 and 20, respectively, in Sciaky and Wrase 1997). They differ with *A. dimorpha* adults in having intervals 1, 3, 5, and 7 markedly convex (only faintly convex in the latter), with *A. sciakyi* adults in having deeply sinuate lateral pronotal margin (only slightly sinuate in the latter), and with *A. kangdingensis* adults in having the deep pronotal lateral sinuation (faintly sinuate in the latter), smooth basal foveae (coarsely rugose in latter), and distinct microsculpture in intervals 1, 3, 5 (absent from these intervals in the latter).

DESCRIPTION.— Total length (measured along midline from apex of longer mandible to apex of longer elytron) 12.9–14.5 mm in males and 12.4–14.6 mm in females; width (measured across greatest width of elytra) 4.8–5.4 mm in males and 5.0–5.7 mm in females. Antennae, mandibles, labrum, femora, tibiae and ventral surface black or reddish black; palpi and tarsi reddish brown; head, pronotum, and elytra with distinct coppery luster (with faint to moderately distinct green highlights in most individuals, most distinct on head and pronotum).

Mandible short, faintly rugose on dorsal surface, hooked and pointed at apex. Labrum transverse, slightly emarginate at apex, with six setae. Clypeus convex. Frontal furrows deep, impunctate, divergent and slightly bifurcate posteriorly. Vertex convex, smooth, impunctate, microsculpture mesh pattern transverse, indistinct. Eyes large, convex. Tempora short, oblique. Antennae extended posteriorly to basal one-eighth of elytra, pubescent from apical half of antennomere 4, antennomere 3 slightly longer than the scape. Terminal labial palpomere slightly dilated toward apex, apex truncate. Mentum tooth wide, moderately emarginate. Ligula widely dilated at apex, with four apical setae.

Pronotum (Fig. 2) large, transverse, widest at or slightly anterior to middle, ratio of pronotal width to length (PW:PL) = 1.33 (range 1.25–1.36 in males, 1.26–1.40 in females), base not or only slightly narrower than apex. Microsculpture mesh pattern transverse, most distinct in lateral furrows and basal foveae. Apical margin slightly emarginate, apical margination widely interrupted in the middle. Apical angles rounded, slightly projected anteriorly. Lateral margins with only a few shallow crenulations, smoothly arcuate from apical angles to one-third from base, then abruptly sinuate to basal angles. Lateral furrow narrow, with four (three or five in a few specimens) setae anterior to the middle, one seta near the basal angle. Basal angles rectangular. Disk convex, sparsely and transversely rugose laterally, longitudinally rugose at middle both apically and basally, basal area deeply depressed. Medial longitudinal impression deep, except shallow at or terminated before both apical and basal margins. Anterior transverse impression shallow, posterior transverse impression deep. Basal foveae smooth, impunctate, outer longitudinal groove slightly S-shaped, one-half as long as inner groove. Prosternum impunctate, with a longitudinal depression in the middle, microsculpture mesh pattern transverse. Pro-, mes-, and met-episterna impunctate, microsculpture mesh pattern distinct, transverse.

Elytra ovate, convex, widest and highest slightly posterior to the middle, ratio of elytral length to width (EL:EW) = 1.51 in males (range 1.45–1.59), 1.38 in females (range 1.33–1.43). Microsculpture mesh pattern distinct, isodiametric. Intervals 1, 3, 5, 7 strongly convex; interval 3 about 2.2 times as wide as interval 4 in the middle, with two dorsal setiferous pores, basal one adjoining stria 3 and apical one (absent in some individuals) adjoining stria 2. Stria shallow, punctures indis-



FIGURES 2-5. Figs. 2-3: Pronotum, dorsal aspect. Fig. 2: *Aristochroa abrupta* sp. nov. Fig. 3: *Aristochroa gratiosa* Tschitschérine. Figs. 4-5: Elytral apex, male, dorsal aspect. Fig. 4: *Aristochroa abrupta*. Fig. 5: *Aristochroa gratiosa*. Scale line = 1.0 mm.

FIGURES 6-7. Male genitalia; a, median lobe, left lateral aspect; b, apex of medial lobe, dorsal aspect; c, right paramere, lateral aspect; d, left paramere, lateral aspect. Fig. 6: *Aristochroa abrupta* sp. nov. Fig. 7: *Aristochroa gratiosa* Tschitschérine. Scale line = 1.0 mm.

FIGURES 8-9. Female genitalia, ventral aspect. Fig. 8: *Aristochroa abrupta* sp. nov. Fig. 9: *Aristochroa gratiosa* Tschitschérine, left ovipositor only. Scale line = 1.0 mm.

tinct, stria 7 with one setiferous pore near the apex. Scutellum smooth, scutellar striole shallow, parascutellar setiferous pore absent. Humerus well-marked, round, slightly tuberculate. Basal margin straight or slightly concave anteriorly, forming an obtuse angle with lateral margin at the humerus. Lateral margin markedly sinuate anterior to apex (Fig. 4). Abdominal sterna impunctate, sparsely rugose laterally. Sternum VII with two pairs of posterior paramedial setae in males (one pair or two pairs with a third seta unilaterally in a few individuals), two pairs of setae in females.

Male with aedeagus distinctly bent at the middle, thickened ventrally anterior to apex, apex thin and slightly bent ventrad in lateral view (Fig. 6a); apical lamella long, triangular, markedly deflected right and apically narrowed in dorsal view (Fig. 6b). Parameres as in Figures 6c and 6d.

Female genitalia as in Figure 8. Gonostylus broad, arcuate. Spermatheca pointed and slightly coiled apically, spermathecal gland elongate, tubular.

SEXUAL DIMORPHISM.—Males with antennae slightly (about 5%) longer than females; females with elytra relatively wider and with greatest elytral width more distinctly posterior to middle than in males.

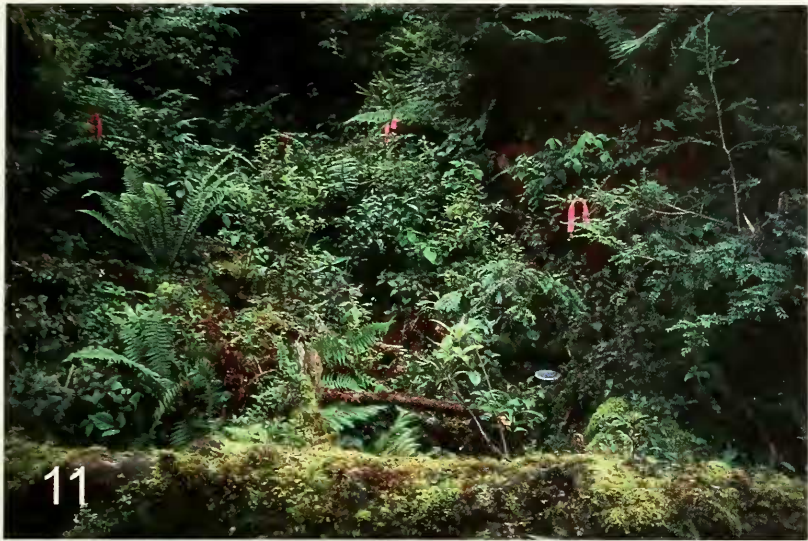
GEOGRAPHICAL DISTRIBUTION.—At present known only from the eastern slope of the Gaoligongshan in Gongshan County, Nujiang Prefecture, western Yunnan Province, China. We have examined a total of 22 specimens (including the holotype and 21 paratypes) from the following localities: Danzhu He drainage [13.5 air km SW of Gongshan, 2830m, N 27.62947°/E 98.62010°, 30 June – 5 July 2000, Stop # 00-17K, D.H. Kavanaugh, C.E. Griswold, H.B. Liang, D. Ubick, and D.Z. Dong collectors (3 males and 1 female); 13.5–13.8 airm SSW of Gongshan, 2720–2840m, N 27.63267°/E 98.60861° to N 27.63331°/E 98.60356°, 30 June – 5 July 2000, Stop # 00-17E, D.H. Kavanaugh, C.E. Griswold, H.B. Liang, D. Ubick, and D.Z. Dong collectors (1 female); 13.5 to 15.7 airm SSW of Gongshan, 2700–3100m, N 27.63063°/E 98.62074° to N 27.62705°/E 98.59204°, 30 June – 5 July 2000, Stop # 00-17A, D.H. Kavanaugh, C.E. Griswold, H.B. Liang, D. Ubick, and D.Z. Dong collectors (2 males, 1 female)]; Qiqi He drainage [Dongshaofang-Yakou, 27°41'40" N, 98°28'47" E, 3400m, 1 May 2002, G. D. Yang collector (1 male); No. 12 Bridge camp area, 16.3 airm W of Gongshan, N 27.71503°/E 98.50244°, 2775m, 15–19 July 2000, Stops # 00-23D and E, D.H. Kavanaugh, C.E. Griswold, H.B. Liang, D. Ubick, and D.Z. Dong collectors (2 males and 5 females); same locality, 2 May 2002, H.B. Liang and W.D. Ba collectors (4 males)]; Pula He drainage [Dabadi, 41 km W of Gongshan on Dulong Valley Road, 3000m, N 27.79655°, E 98.50562°, 27 September to 6 October 2002, Stop # DHK-2002-031F, D.H. Kavanaugh, P.E. Marek, H.B. Liang, X.C. Liang, & D.Z. Dong collectors. (2 females)].

GEOGRAPHICAL VARIATION.—No locality-specific morphological differences have been observed among individuals from the different localities sampled for this species.

HABITAT DISTRIBUTION.—Adults of this species have been collected from several localities on the eastern slope of the Gaoligongshan, in two different major drainage systems: the Danzhu He and Pula He systems. Compared with most other known species of *Aristochroa*, the new species occurs at lower elevations, ranging from 2770m to 3400m. Most *Aristochroa* species are restricted to montane regions above 4000 m (range for the genus from 2500–5000 m), with all known records below 4000 m confined to areas well north of the known range of *A. abrupta* (in Sichuan and



FIGURE 10. Map of the Gongshan study area (insert; study area outlined in white; black box locates area of enlargement). Sites at which specimens of *Aristochroa abrupta* sp. nov. were collected are identified by solid white circles and the type locality by a star.



FIGURES 11–12. Photographs of habitat for *Aristochroa abrupta* sp. nov., eastern slope of the Gaoligong Shan, Gongshan County, western Yunnan Province, China. Fig. 10. Forest in valley of Qiqi He at No. 12 Bridge Camp, 16.3 km W of Gongshan, 2775 m; adult beetles collected mainly in pitfall traps placed on the forest floor in this habitat (at locations marked by pink flagging tape in photograph). Fig. 11. Type locality, valley of Danzhu He, 13.5 km SW of Gongshan, 2380 m; adult beetles collected at night along road cut near or on large granitic boulders.

Shaanxi provinces), except for *Aristochroa dequiniensis* Xie and Yu (1993), also from northern Yunnan, with a known altitudinal range from 3450–4650 m. The only species known to occur at elevations as low as *A. abrupta* is *Aristochroa militaris* Sciaky and Wrase (1997) (with a known altitudinal range of 2500–3300 m), which occurs at the northern distributional limit for the genus in Shaanxi Province (at 33.51°N).

At each of the known localities, *A. abrupta* adults have been found in mixed conifer and broadleaf deciduous forest, either on the forest floor, which includes a moist, mossy and shrubby understory (Fig. 11), or along road cuts through granitic sandy soils and boulders. In the latter habitat, beetles were collected by hand, mainly at night, on or near large boulders (Fig. 12).

ETYMOLOGY.—The specific epithet is derived from the Latin, *abruptus*, meaning broken off or cut off, in reference to the deep and abrupt basolateral sinuation cut into the lateral margin of the pronotum.

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